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**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>PC-21006045</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. <b>PCT/SE2003/001514</b>	International filing date (day/month/year) <b>2003-09-30</b>	Priority date (day/month/year) <b>2002-09-20</b>
International Patent Classification (IPC) or national classification and IPC <b>G09B 23/28</b>		
Applicant <b>Göteborg University Surgical Science AB et al</b>		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
  - ☐ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:
    - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

Date of submission of the demand <b>26-04-2004</b>	Date of completion of this report <b>12-01-2005</b>
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Form PCT/IPEA/409 (cover sheet) (January 2004)

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2003/001514

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))  
☐ publication of the international application (under Rule 12.4)  
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☐ the description:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the claims:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19

pages\* 12-14 received by this Authority on 22-12-2004

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ the drawings:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2003/001514

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	<u>1-12</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-12</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-12</u>	YES
	Claims		NO

## 2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US5771181 A  
D2: US6336812 B1  
D3: WO9628800 A1  
D4: WO0178039 A2

The cited documents represent the general state of the art.  
The invention defined in claims 1-12 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed surgical simulation system in which different virtual anatomic environments can be generated by assembling models of local anatomic environments. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-12 is novel and is considered to involve an inventive step. The invention is industrially applicable.

CLAIMS

1. A method for generating a virtual anatomic environment (4) for use in a computer based visual simulation of minimally invasive surgery, comprising the steps of:

providing a main virtual anatomic environment (1),  
selecting a local anatomic environment (2) from a predefined library (3) comprising a set of two or more separately modelled local anatomic environments (2),  
including the selected local anatomic environment (2) in said main anatomic environment (1) to form said virtual anatomic environment (4),  
thereby allowing generation of different virtual environments.

2. A method according to claim 1, wherein said set of local anatomic environments (2) is arranged to represent a set of anatomic variations for a critical internal area, occurring in living beings.

3. A method according to claim 1 or 2, wherein the step of selecting a local anatomic environment (2) from a predefined library (3) comprising two or more of simulated local anatomic environments (2) further comprises the step of randomly selecting one of the local anatomic environments (2) in the library (3).

4. A method according to claim 3, wherein the probability of randomly selecting a certain local anatomic environment (2) essentially corresponds with the degree of occurrence of that local anatomic environment in living beings.

5. A method according to any one of the preceding claims, wherein the main virtual anatomic environment (1) is arranged to model an internal cavity (5) of a human,

such as an abdominal cavity or a chest cavity, while the set of local anatomic environments is arranged to simulate different arrangements of arteries, veins and ducts (7) around an organ (6) arranged in said internal cavity (5), such as a gall bladder or a heart.

6. A method according to any one of the claims 1-2 or 5, further comprising the step of selecting, by means of user selection, a certain one of said local anatomic environments (2) from said library (3) and including it into said main virtual environment (1).

7. A device for generating a virtual anatomic environment (4) for use in a computer based visual simulation of minimally invasive surgery, comprising:

a modelling device (15) for providing a main virtual anatomic environment (1),

a library (3), comprising a set of two or more separately modelled local anatomic environments (2),

means for incorporating one of the local anatomic environments (2) of the library (3) into the main virtual anatomic environment (1), together forming said virtual anatomic environment (4),

thereby allowing generation of different virtual environments.

8. A device according to claim 7, further comprising a selection device (9) for selecting one of said local anatomic environments (2) from said library (3) to be included in said main anatomic environment.

9. A device according to claim 8, wherein the selection device (9) is arranged to randomly select one of said local anatomic environments (2) from said library (3) to be included in said main anatomic environment.

10. A device according to claim 9, wherein the selection device (9) is arranged to randomly select one of said local anatomic environments (2) in such a way that the probability of selecting a certain local anatomic environment (2) essentially corresponds with the degree of occurrence of that local anatomic environment in human beings.

11. A device according to any one of the claims 7-10, wherein the main virtual anatomic environment (1) is arranged to model an internal cavity (5) of a human, such as an abdominal cavity or a chest cavity, while the set of local anatomic environments (2) is arranged to simulate different arrangements of arteries, veins and ducts (7) around an organ (6) arranged in said internal cavity (5), such as a gall bladder or a heart.

12. A computer-based minimal-invasive surgery simulation system, comprising a device for generating a virtual anatomic environment as described in any one of the claims 7-11.